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MOUNTING AND LIFTING DEVICE
[Saichi shokou sochi]

Masahiro Ichihara et al.

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INVENTORS	(72):	Masahiro Ichihara et al.
APPLICANT	(71):	000001052 Kubota K.K.
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Claim

1. A mounting and lifting device, which is a mounting and lifting device that has a lift guiding rail (3) arranged in a diagonal direction along stairs (1), a lifting driver (5) that is provided with guided movement along this rail (3), and a mounting member (6) for mounting a conveyed item supported on this lifting driver (5), in which an area at one end of the aforementioned mounting member (6) is pivotally supported on the aforementioned lifting driver (5) in a freely rotating manner around the center of a vertical shaft, and a pulling means (15) for pressing and pulling an area at the other end of the aforementioned mounting member (6) towards the aforementioned rail (3) is also provided.

Detailed explanation of the invention

[0001]

Industrial application field

The present invention relates to a mounting and lifting device that is used for lifting a physically challenged person up stairs, for example, or for lifting goods up and down along stairs in a factory, for example. In more detail, it relates to a mounting and lifting device that has a lift guiding rail arranged in a diagonal direction along stairs, a lifting driver that is provided with guided movement along this rail, and a mounting member for mounting a conveyed item supported on this lifting driver.

[0002]

Prior art

An aforementioned mounting and lifting device is conventionally comprised in a manner such that the aforementioned lifting driver and the aforementioned mounting member are integrally fixed together

so that the same perpendicular position can be maintained by goods and a person, etc. that is mounted over the mounting member during the lifting operation.

[0003]

Problem to be solved by the invention

The aforementioned conventional structure is convenient when stairs consist of only a straight part. However, if there is an area of spiral stairs in the middle of a stairway, the aforementioned rail cannot be arranged in a straight form, and a structure must be used in which it curves along the area of spiral stairs, and a problem exists in that the aforementioned lifting driver and the mounting member move integrally constantly in a position along the tangential direction of the curved area in said area where the rail curves, and as a result the corner part of the mounting member projects towards the outside of the rail, and there is a high risk of interference with the side wall, and a smooth lifting movement cannot be obtained. The objective of the present invention is to solve the aforementioned problem.

[0004]

Means to solve the problems

The characteristic structure of this invention is the feature that an area at one end of the aforementioned mounting member is pivotally supported on the aforementioned lifting driver in a freely rotating manner around the center of a vertical shaft, and a pulling means for pressing and pulling an area at the other end of the aforementioned mounting member towards the aforementioned rail is also provided in the mounting and lifting device recited in the foregoing.

[0005]

Operation of the invention

In an area where the lift guiding rail is curved in a horizontal direction at an intermediate part, the lifting driver moves in a position along the tangential direction of the curved area of the rail due to its driven movement. However, the mounting member that mounts and supports a conveyed item freely rotates around the aforementioned center of a vertical shaft. Moreover, the side of the rotational end is also pressed and pulled towards the rail by a pulling means. Therefore, the position of the mounting member is regulated by two points including the position of the aforementioned center of the vertical shaft and the pressing and contact part with the rail, and positioning inside the curve in the curved area of the rail occurs.

[0006]

Effect of the invention

As a result, the risk of contact of the corner part of the mounting member with the wall, etc., that is present at the outer side of the curved area of the rail will be reduced, a smooth lifting movement can be attained even in a curved area of small curvature, and a safe lift is now possible without dropping mounted goods and without an unstable sitting position of a physically challenged person when coming into contact with the wall.

[0007]

Embodiment

An embodiment will be explained based on the figures below. Figure 2 indicates a mounting and lifting device that mounts a physically challenged person and goods, etc., and lifts them up and down

along stairs. This mounting and lifting device has a structure that has a lift guiding rail (3) attached in a diagonal direction along stairs (1) at a side wall (2) of the stairs (1), and that also is provided with a moving device (4) that is driven to ascend and descend along this rail (3). The aforementioned moving device (4) is comprised of a lifting driver (5), which has an internally installed move-driving motor M powered by electricity, and a mounting member (6), which is arranged on top of it, and it is comprised to have a conveyed item, such as goods or a person, for example, mounted over the mounting surface (6a) of the mounting member (6) and to freely move to ascend and descend along the rail (3).

[0008]

To describe in more detail, the aforementioned rail (3) is formed in a cross-sectional rectangular shape and is attached and connected to a side wall (2) by an arm (7) that projects from the side at suitable locations, as indicated in Figures 3 and 4 [sic; 1 and 4]. A rack gear (8) is formed in the central area at the lower face side of this rail (3) nearly along the entire length in the longitudinal direction. A pinion gear (9) equipped in the lift driver engages with this rack gear (8), and ascending and descending occurs by driving to rotate the pinion gear (9) by the electric motor M. More precisely, the constitution is such that a frame (10) that covers the rail (3) is provided to the lifting driver (5), upper and lower guiding rollers (11) in a pair are respectively supported on this frame (10) in the moving direction at two locations at the front and rear, and the lifting driver (5) is supported in a state such that the rail (3) is held by each guiding roller (11) in a vertical direction so said rollers can freely move in a longitudinal direction with their position regulated in the vertical direction, and the constitution is also such that a driven supporting shaft (13) of the pinion gear (9), which supports the output of the electric motor M supported on the aforementioned frame (10) through a worm gear type speed reducing mechanism (not shown in the illustration) while engaged with the aforementioned rack gear (8), is driven to rotate at low

speed. The aforementioned frame (10) also has a split structure including a front frame (10a) that supports the front guiding rollers (11) and a back side frame (10b) that supports the back guiding rollers (11). These respective split frames (10a) and (10b) are pivotally supported and connected around the center of a vertical shaft Y1 in the center in a freely buckling manner and are comprised to move smoothly even in a curved area with a small radius of curvature in the horizontal direction. The aforementioned pinion gear (9) and the back guiding rollers (11) are set up on the same plane in the vertical direction for ensuring engagement with each other and for preventing the occurrence of torsion as much as possible.

[0009]

Then, as indicated in Figure 1, the front end area of the mounting member (6) in the moving direction is pivotally supported to the lifting driver (5) in a manner such that it can freely rotate around the center of a vertical shaft Y2, and a guiding roller (14) is supported at the back in the moving direction of the mounting member (6), and a spring (15) (an example of a pulling means) that presses and pulls this guiding roller (14) towards the rail (3) is stretched across between an intermediate part of the rotation of the mounting member (6) and the lifting driver (5). In this structure, even if an intermediate area of the rail (3) in the spiral area of the stairs is curved in a horizontal direction, the lifting driver (5) is driven to move along the rail (3), the mounting member (6) rotates relative to the lifting driver (5) around the aforementioned center of the vertical shaft Y2, the guiding roller (14) is guided while constantly pressing and contacting the rail (3), and the mounting member (6) moves while having its position regulated at two points including the aforementioned pivotally supported and connected point and the contacting part with the guiding roller (14). Accordingly, the mounting member (6), which is formed relatively wide for mounting a conveyed item, moves inside the curve in the curved area in a horizontal

direction, and contact of the corner area with the wall (2) that is present outside the curved area can be prevented.

[0010]

Numbers are used in the clause in the scope of the patent claim for easy contrast with the figures, but said entries do not restrict the invention to the structures of the figures that are attached.

Brief description of the figures

Figure 1 is a top plan view diagram of a lifting device.

Figure 2 is a side plan view diagram of the lifting device.

Figure 3 is a cut-off side plan view diagram of the lifting driver.

Figure 4 is a cut-off back plan view diagram of the lifting driver.

Explanation of symbols

- | | |
|----|-----------------|
| 1 | Stairs |
| 3 | Rail |
| 5 | Lifting driver |
| 6 | Mounting member |
| 15 | Pulling means |

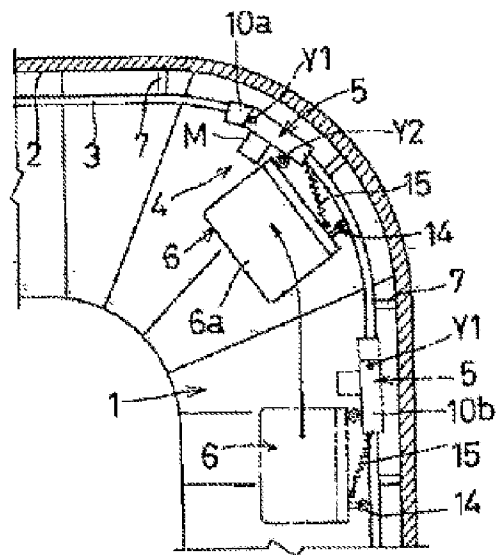


Figure 1

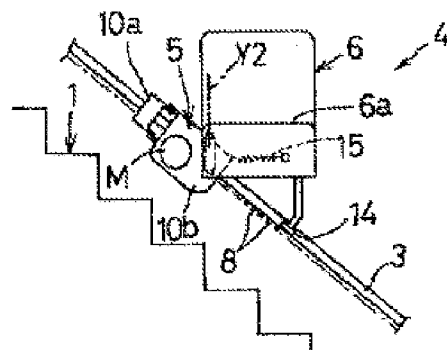


Figure 2

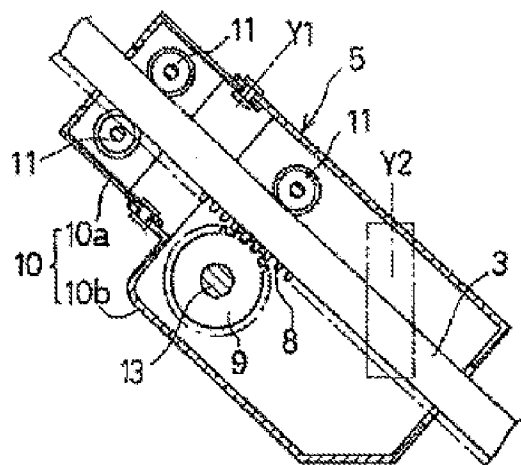


Figure 3

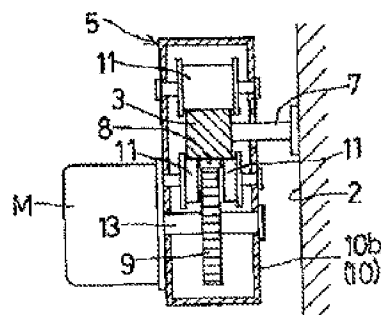


Figure 4